

**Before the
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554**

In the Matter of)	
)	
Amendment of Parts 2, 25, and 87 of the)	
Commission's Rules to Implement Decisions)	ET Docket No. 02-305
from World Radiocommunication Conferences)	
Concerning Frequency Bands Between 28 MHz)	
and 36 GHz and to Otherwise Update the Rules)	
in the Frequency Range)	
)	
Amendment of Parts 2 and 25 of the)	
Commission's Rules to Allocate Spectrum For)	RM-10331
Government and Non-Government Use in the)	
Radionavigation-Satellite Service)	

COMMENTS OF INMARSAT VENTURES PLC

Inmarsat Ventures plc ("Inmarsat"), hereby comments on the Notice of Proposed Rule Making in the above-captioned proceeding.¹ Inmarsat is a global satellite operator providing a broad array of mobile satellite communications services using the L-band both within and outside the United States. These services include search and rescue communications to ships at sea and aeronautical services to commercial planes. Inmarsat, therefore, is uniquely qualified to provide comments on the Commission's proposed rule changes.

Inmarsat supports the Commission's adoption of generic mobile satellite service ("MSS") allocations that are consistent with the decisions of WRC-97 and WRC-2000, in which the United States was an influential participant. As the Commission notes, use of aeronautical telemetry ("AT") in the band 1525-1535 MHz can result in potential harmful interference problems; therefore, Inmarsat supports the deletion of AT as a secondary mobile allocation in this band. Inmarsat, however, believes that the Commission's maintenance of footnotes US308 and US315 would create confusion and that these

¹ *In the Matter of Amendment of Parts 2, 25, and 87 of the Commission's Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Between 28 MHz and 36 GHz and to Otherwise Update the Rules in the Frequency Range; Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum For Government and Non-Government Use in the Radionavigation-Satellite Service*, Notice of Proposed Rule Making, ET Docket No. 02-305 and RM-10331 (rel. October 7, 2002) ("*NPRM*").

footnotes are unnecessary. Similarly, the proposed footnotes to protect radionavigation-satellite service (“RNSS”) and the proposed addition of definitions to Part 2 of the Commission’s Rules are unnecessary to achieve the Commission’s goals and may create unintended conflicts. If the Commission finds that special provisions for RNSS are necessary and adopts footnote US343, Inmarsat seeks clarification that the footnote applies to Inmarsat satellites.

Finally, Inmarsat requests that the Commission review footnote US309. US309 allows for transmissions between the ground and aircraft to supplement aircraft-to-satellite links in the 1545-1559 MHz and 1646.5-1660.5 MHz bands. Despite the footnote, Inmarsat is unaware of any such service being offered on these bands. Because of the congestion in the MSS bands and the lack of use, Inmarsat urges the Commission to delete US309.

I. GENERIC MSS PROPOSALS AT L-BAND

After many years of deliberation, generic MSS allocations were adopted at L-band by WRC-97. Some further changes to the provisions surrounding these allocations were made at WRC-2000. During the process, the United States was one of the driving forces behind this change from segmented to generic L-band MSS allocations. The Commission has sought comment on a series of generic MSS proposals designed to implement the WRC generic MSS decisions.²

Inmarsat agrees with the action taken by WRC-97 and WRC-2000, which acknowledge that the scarce L-band spectrum can be most efficiently managed through generic allocations. Inmarsat therefore supports the Commission’s proposal to align the MSS allocations in the bands 1525-1559 MHz and 1626.5-1660.5 MHz in the US Table of Frequency Allocations with the MSS allocations appearing in the international Table of Frequency Allocations. Inmarsat addresses below the Commission’s specific proposals regarding AT, Global Maritime Distress and Safety System (“GMDSS”) and Aeronautical-Mobile-Satellite (R) service (“AMS(R)S”).

² See *NPRM* at ¶ 18.

A. Aeronautical Telemetry Should Be Deleted From The 1525-1535 MHz Band

The Commission requests comment on whether the secondary mobile allocation, which is limited to aeronautical telemetry, should be deleted from the band 1525-1535 MHz in the United States Table of Frequency Allocations.³ The two sections below address, respectively, the sharing feasibility with regard to interference from MSS satellites to aeronautical telemetry receivers and interference from aeronautical telemetry transmitters to mobile earth stations (“MES”). As the discussion below shows, sharing between MSS downlinks and AT in the band 1525-1535 MHz is likely to lead to interference to both services. Inmarsat therefore supports the deletion of the secondary mobile allocation in the band 1525-1535 MHz.

1. Interference From MSS Satellites To Aeronautical Telemetry Receivers

The issue of sharing between MSS and AT systems has been studied by the ITU-R in connection with WRC-03 Agenda Item 1.31. There has been general agreement on the conclusion that co-frequency, co-coverage sharing between MSS downlinks and the AT systems operated in the U.S. is not feasible. Recommendation ITU-R M.1459 gives power flux density (“pfd”) levels required to be met by MSS downlinks to protect certain types of AT systems. Contributions from the U.S. to WP8B and WP8D have indicated that the types of AT systems described in M.1459 are in operation in the U.S. The pfd levels given in M.1459 are much lower than the operational pfd levels required by MSS systems. Co-coverage sharing between MSS downlinks and U.S. AT systems would therefore likely lead to interference into the AT systems.

The ITU-R studies were based on systems operating in or planned for the band 1518-1525 MHz. However, if the characteristics of AT systems do not differ significantly between the two bands these negative conclusions regarding sharing also apply equally to the band 1525-1535 MHz.

³ See *NPRM* at ¶ 20.

2. Interference From Aeronautical Telemetry Into MES

There is also a potential for interference from an AT transmitter onboard an aircraft to MES. For example, Inmarsat has analyzed the potential interference to two of Inmarsat's terminal types and those interference calculations are shown in Annex A.

The results demonstrate that a single airborne transmitter would cause harmful interference to an MES anywhere within its visibility. For an aircraft flying at an altitude of 20 kilometers, the radio horizon is at a distance of about 580 kilometers. The use of airborne transmitters operating in the same frequency band as MSS would therefore cause interference to MES over a large geographical area. There is no mechanism for AT to avoid causing harmful interference to MES without applying geographical constraints to MES. Such constraints would be contrary to the higher allocation status afforded to MSS in this band; hence, a secondary allocation for mobile aeronautical telemetry is incompatible with a primary allocation to MSS. Inmarsat therefore supports the proposal for deleting the secondary allocation to mobile services in the band 1525-1535 MHz and the consequential modification to footnote US78.

B. Maintenance Of Footnotes US315 And US308 Would Cause Unnecessary Confusion

The Commission also seeks comment on its proposal to maintain footnotes US308 and US315. Because the footnotes are duplicative of international footnotes 5.353A, 5.357A, and 5.362A, Inmarsat urges the Commission to suppress US308 and US315. Such action will forestall potential confusion and resolve potential conflicts between the U.S. footnotes and the Commission's adoption of certain generic MSS proposals.

Footnote US315 provides priority to GMDSS applications over generic MSS applications in the 1530-1544 MHz and 1626.5-1646.5 MHz bands. Footnote 5.353A also applies priority to GMDSS systems in the same frequency bands but with different wording. Similarly, footnotes US308, 5.357A and 5.362A provide priority to AMS(R)S over other MSS applications in different segments of the 1545-1559 MHz and 1646.5-1660.5 MHz bands.

The national and international footnotes applying in these bands are similar but not identical. Inmarsat believes that it is unnecessary and potentially confusing to have two sets of footnotes addressing the same issue. Inmarsat supports the application of the international footnotes 5.353A, 5.357A and 5.362A only and the suppression of US315 and US308. Footnotes 5.353A, 3.357A and the associated Resolution 222 are based on extensive ITU-R studies over several years and debate at two World Radio Conferences. These international footnotes provide a regulatory framework that ensures the availability of spectrum for GMDSS and AMS(R)S in the current technological environment, whereas US315 and US308 have not been changed to take into account the ITU-R studies.

US315 and US308 state that maritime and aeronautical distress and safety communications “shall have priority access with real-time preemptive capability in the mobile-satellite service.” This could be read to suggest that systems must have real-time *inter-system* preemptive capability. Unfortunately, after several years of study, the ITU-R has not been able to determine how to establish a feasible method of real-time inter-system pre-emption. Resolution 222 requests the ITU-R “to complete studies to determine the feasibility and practicality of prioritization and real-time pre-emptive access between different networks of mobile-satellite systems” and these studies are still ongoing in Working Party 8D. So far no methods have been presented that demonstrate the feasibility and practicality of this concept. Inmarsat believes that inter-system pre-emption is not feasible. After years of study, no one has been able to produce a viable method for implementing the concept. In any case, before the completion of studies, it would be unreasonable for the FCC to maintain footnotes that call for inter-system pre-emption.

US315 and US308 also put certain MSS communications on a secondary basis with respect to GMDSS and AMS(R)S systems. In footnote US315, all non-GMDSS communications are given a secondary status, presumably in the bands 1530-1544 MHz and 1626.5-1645.5 MHz. This is in conflict with the change to generic allocations. Footnote US308 places systems not inter-operable with the AMS(R)S on a secondary basis. This would be consistent with a requirement that systems must

employ inter-system pre-emption but, as mentioned above, inter-system pre-emption is an unreasonable condition for MSS unless and until the concept has been proven.

For the above reasons, Inmarsat proposes that the Commission apply the international footnotes 5.353A, 5.357A and 5.362A and suppress footnotes US315 and US308. In any event, U315 does not currently apply to the band 1525-1530 MHz. Inmarsat recommends that the Commission not extend application of US315 to the band 1525-1535 MHz for the reasons discussed herein.

C. Footnote US309

Footnote US309 allows for transmissions between the ground and aircraft to supplement aircraft-to-satellite links. The footnote applies to the bands 1545-1559 MHz and 1646.5-1660.5 MHz (2x14 MHz). Similar footnotes are included in the ITU allocation table (5.357 and 5.376) but are limited to the frequency bands 1545-1555 MHz and 1646.5-1656.5 MHz (2x10 MHz). Inmarsat is not aware of any use of ground-to-aircraft links in these frequency bands. Due to the existing congestion in the MSS bands, Inmarsat urges the Commission to discourage the use of ground-to-aircraft links.

Inmarsat therefore requests that the Commission review the retention of this footnote and to delete it. If, however, the Commission finds that there is a need to retain a footnote to address transmissions between the ground and aircraft to supplement aircraft-to-satellite links, Inmarsat urges the Commission to apply international footnotes 5.357 and 5.376 in place of US309.

II. RNSS ALLOCATIONS

Inmarsat provides space segment for the GPS Wide Area Augmentation System ("WAAS"). The current Inmarsat satellite network provides an augmentation signal in the L1 frequency band and this will be supplemented by a signal in the L5 band with the launch of the Inmarsat-4 series of satellites, which are planned for launch starting in 2004. The downlinks from the satellites operate as part of the RNSS. The uplinks for both signals are provided by land earth stations, which operate in the FSS allocations in the extended C-band.

A. Proposed National Footnote To Protect Aeronautical Radionavigation Service Will Cause Confusion And Is Unnecessary

The Commission seeks comment on its proposal to add the following footnote regarding the protection of RNSS:

USyyy The band 1164-1189 MHz is also allocated to the radionavigation-satellite service (space-to-Earth, space-to-space) on a primary basis. In this band, stations in the radionavigation-satellite service shall not cause harmful interference to, nor claim protection from, stations of the aeronautical radionavigation service.⁴

Inmarsat supports the allocation to RNSS (space-to-Earth, space-to-space) in this band. However, it is unnecessary for the Commission to add a footnote stating that stations in the RNSS shall not cause harmful interference to stations in the aeronautical radionavigation service (“ARNS”). The protection requirements for the aeronautical radionavigation service are currently provided through international footnote 5.328A which provides for an aggregate pfd limit of $-115 \text{ dB(W/m}^2\text{)}$ in a 1 MHz bandwidth. This value is likely to be replaced by an aggregate equivalent power flux density (“epfd”) limit at WRC-03.⁵ Whether or not the footnote is modified at WRC-03, the pfd (or epfd) limits will define the power level to which ARNS shall be protected. Hence the additional requirement to not cause harmful interference is superfluous and possibly contradictory to the specific power limits that are designed to achieve this same goal.

B. Proposed Part 2 Definitions Create Ambiguity

The Commission also seeks comment on its proposed clarification to Part 2 of its Rules by the introduction of the following new definitions:

Differential Radionavigation Satellite Service (Differential RNSS) Station. A station used for the transmission of differential correction data and related information (such as ionospheric data and RNSS satellite integrity information) as an augmentation to an RNSS system for the purpose of improved navigation accuracy.

Differential Global Positioning System (DGPS) Station. A differential RNSS station for specific augmentation of GPS.⁶

⁴ See NPRM at ¶¶ 34 and 37.

⁵ See CPM Report to WRC-03 at Section 1.2.1.

⁶ See NPRM at ¶ 38.

The Commission states that the purpose of these definitions is to clarify the difference between WAAS and LAAS, but does not provide any additional benefits or examine the consequences of adopting the proposed definitions.

Inmarsat does not believe that there is a need for adding either of these definitions to the Rules and believes that confusion will result, instead of clarity. The Inmarsat space stations meet both of these proposed definitions, while also meeting the definition of a space station in the RNSS. Similarly, the Inmarsat land earth stations meet both of these proposed definitions, while also meeting the definition of an earth station in the FSS. Hence the proposals make the situation more confusing by having a single station meet the definitions of three different types of stations where previously only one station type applied.

The existing rules which apply to RNSS space stations and FSS earth stations are satisfactory and there does not appear to be any justification for applying different rules to these station types. If the Commission does proceed to add these definitions to the Rules, Inmarsat requests the Commission clarify that the addition of the definitions is not meant to change the rules regarding RNSS space stations and FSS earth stations which provide GPS augmentation services.

C. US343 Should Apply To Inmarsat Satellites

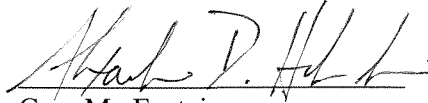
Finally, the Commission requests comment on whether the band 1164-1189 MHz should be added to proposed footnote US343.⁷ As noted above, Inmarsat intends to provide space capacity for GPS augmentation service with a signal in this band. Inmarsat does not see the need for making special provisions for RNSS systems which are used for augmentation purposes. However, if the Commission adds footnote US343, the proposed amendment to the footnote should apply to Inmarsat satellites.

⁷ See *NPRM* at ¶ 40.

CONCLUSION

For the reasons discussed above, Inmarsat supports the Commission's adoption of generic MSS allocations that are consistent with the conclusions of WRC-97 and WRC-2000. Deletion of AT as a secondary mobile allocation would forestall potential harmful interference problems. Inmarsat also urges the Commission to suppress existing footnotes US308, US315 and not adopt the proposed footnotes to protect RNSS or the proposed additional Part 2 definitions. Retention of US308 and US315 and adoption of the proposed changes are both unnecessary to achieve the Commission's goals and would create confusion. If the Commission, however, finds that special provisions for RNSS are necessary and adopts footnote US343, Inmarsat seeks clarification that the footnote applies to Inmarsat satellites. Finally, Inmarsat requests that the Commission delete footnote US309.

Respectfully submitted,



Gary M. Epstein
John P. Janka
Alexander D. Hoehn-Saric
LATHAM & WATKINS LLP
555 11th Street, N.W.
Suite 1000
Washington, D.C. 20004
(202) 637-2200 (phone)
(202) 637-2201 (fax)

Counsel for INMARSAT VENTURES PLC

February 10, 2002

Annex A

Evaluation of Interference from AT aircraft transmitters to mobile Earth stations

The following table shows the calculation of the required separation distance for an aircraft transmitter with respect to an MES. The assumed parameter values are neither the best case, nor worst case but the results are such that modifications to the parameter values will not significantly effect the conclusions.

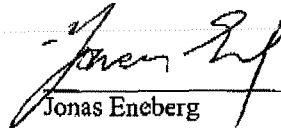
The parameters of the aircraft transmitter are based on those given in Recommendation ITU-R M.1459. The parameters of the MESs are based on the Inmarsat-C and Mini-M terminal types.

Parameter	Value		Notes
Aircraft eirp (dBW)	10		M.1459 gives a range of values of 2 - 25 W
emission B/W (kHz)	5000		M.1459 gives a range of values of 1, 3 or 5 MHz
eirp in receiver B/W (dBW)	-20.0	-18.2	
Inmarsat MES type	C	Mini-M	
MES antenna gain (dBi)	0	10	
MES G/T	-23	-17	
MES temp (K)	199.5	501.2	
MES receiver B/W (kHz)	5	7.5	
MES noise power (dBW)	-168.6	-162.9	
Max interference (dBW)	-180.6	-174.9	Interference criterion: $\Delta T/T = 6\%$
Required path loss (dB)	160.6	166.6	
Required separation distance (km)	1680	3351	Assuming free space loss

The maximum range of visibility of the aircraft varies with its height above ground level. Assuming a maximum height of 20 km, and an effective earth radius of 8500 km, then the horizon distance is about 580 km. Since this distance is less than the required separation distance, it can be concluded that the aircraft will cause excessive interference at least to any MES within its range of visibility.

CERTIFICATION OF PERSON RESPONSIBLE
FOR PREPARING TECHNICAL INFORMATION

I hereby certify that I am the technically qualified person responsible for preparation of the technical information contained in the foregoing submission, that I am familiar with Part 2 of the Commission's rules, that I have either prepared or reviewed the technical information submitted in the pleading, and that it is complete and accurate to the best of my knowledge and belief.



Jonas Eneberg

INMARSAT VENTURES PLC
99 City Road
London EC1Y 1AX
United Kingdom
+44 20 77281475

Dated: February 10, 2003